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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/762,050
Filing Date: January 16, 2004
Appellant(s): SCHILLING ET AL.

Klaus J. Bach
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 11/6/07 appealing from the Office action mailed 4/9/07.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct; however, the 35 U.S.C. 102 rejection of claims 1-8 and 10 as being anticipated by Nishihara JPN 2002-256453A has been altered by the examiner

into a 35 U.S.C. 102/103 rejection. The 35 U.S.C. 102/103 rejection of claims 1-8 and 10 over Nishihara JPN 2002-256453A is a new grounds of rejection.

NEW GROUND(S) OF REJECTION

Claims 1-8 and 10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nishihara (JPN 2002-256453A).

With respect to independent claim 1, Nishihara teaches a method for joining at least two workpieces (8,5) by friction stir welding using a rotating tool (2) with a pin-like projection (2c) (abstract; and Figure 1) comprising the steps of: [a] placing said at least two workpieces (8,5) on top of one another such that the areas to be joined are disposed adjacent one another (Figure 1), [b] moving said rotating tool (2) onto the uppermost workpiece (8) in the area where the workpieces are to be joined such that said pin-like projection (2c) engages said uppermost workpiece (8) (Figure 1) and, while being pressed against said workpiece (8), generates friction heat to at least plasticize the material of said uppermost workpiece (8). The friction stir tool of Nishihara inherently plasticizes the uppermost workpiece (8).

Nishihara also teaches [c] moving said rotating tool (2) axially toward the lowermost workpiece (5) through the material being plasticized only until it contacts the top surface of the lowermost workpiece (5) without penetrating the lower workpiece (5) so as to produce (Figure 1), due to friction of the pin-like projection (2c) on the surface of the lowermost workpiece (5), a metallically clean surface whereby a gastight joint is formed between the upper (8) and the lowermost workpiece (5). It is the examiner's position that Figure 1 of Nishihara positively teaches that the tip of the friction stir tool is

brought into contact with the top surface of the lowermost workpiece. It should be noted that Nishihara does not teach or suggest that the tip of the friction stir tool penetrates into the lowermost workpiece. If the lowermost workpiece was penetrated during the friction stir process a portion of the lowermost workpiece would be pulled into recesses (5a) and the joint would not look like that of Figure 1. Thus, the process described by Nishihara inherently results in a metallically clean surface whereby a gas tight joint is formed between the upper and the lowermost workpiece.

If Figure 1 of Nishihara does not anticipate the limitation "moving said rotating tool axially toward the lowermost workpiece through the material being plasticized only until it contacts the top surface of the lowermost workpiece without penetrating the lower workpiece", then it is the examiner's position that at the time of the invention this limitation would have been obvious to one of ordinary skill in the art. One of ordinary skill in the art would have been motivated to bring the tip rotating tool into contact with the top surface of the lowermost workpiece without penetrating the lowermost workpiece in order to optimize the flow of plasticized material from the upper workpiece into the recess of the lower workpiece. In other words, it would have been obvious to one of ordinary skill in the art to set the plunge depth of the friction stir tool to the top surface of the lowermost workpiece in order to maximize the downward flow of the upper workpiece into the recess. The closer the tip of the rotating tool is brought to the interface between the upper and lower workpieces the more easily the plasticized material of the upper workpiece will flow into the recess of the lower workpiece. Accordingly, the friction stir process described by Nishihara would clearly have the

highest efficiency when the tip of the friction stir tool just contacts the surface of the lowermost workpiece. This obvious technique insures that a proper joint is formed and no voids occur in the recess. Additionally, it is the examiner's position that this process intrinsically results in a metallically clean surface whereby a gas tight joint is formed between the upper and the lowermost workpiece. The rotating tool of Nishihara is ultimately removed from the workpieces.

With respect to claim 2, it is the examiner's position that since Nishihara and the applicant are performing the same process with the same materials alloying will occur at the interface between the two materials being joined in Nishihara.

With respect to claim 3, it is the examiner's position that the process of Nishihara will inherently remove oxides from the surfaces of the workpieces as the pin-like projection frictionally engages the surfaces of the workpieces.

With respect to claim 4, Nishihara teaches that the tool with the pin-like projection is moved along the joint area (Figures 1 and 12).

The limitation of claim 5 is inherent to friction stir processing.

With respect to claim 6, Nishihara teaches that the pressure is applied by a shoulder (2b) of the tool around the pin-like projection (2c) (Figure 1).

With respect to claim 7, Nishihara teaches that the workpieces are joined also in a form-locking manner (Figures 1 and 12).

With respect to claim 8, Nishihara teaches that the workpieces are joined in a form-locking manner by the introduction of plasticized material into cavities formed into the lower workpiece (Figures 1 and 12).

With respect to claim 10, it is the examiner's position that the limitation "wherein the length of said pin-like projection is selected so as to correspond essentially to the thickness of the uppermost workpiece or upper workpieces placed on top of the lowermost workpiece" is inherent to Figure 1 of Nishihara.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-8 and 10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nishihara (JPN 2002-256453A).

With respect to independent claim 1, Nishihara teaches a method for joining at least two workpieces (8,5) by friction stir welding using a rotating tool (2) with a pin-like projection (2c) (abstract; and Figure 1) comprising the steps of: [a] placing said at least

two workpieces (8,5) on top of one another such that the areas to be joined are disposed adjacent one another (Figure 1), [b] moving said rotating tool (2) onto the uppermost workpiece (8) in the area where the workpieces are to be joined such that said pin-like projection (2c) engages said uppermost workpiece (8) (Figure 1) and, while being pressed against said workpiece (8), generates friction heat to at least plasticize the material of said uppermost workpiece (8). The friction stir tool of Nishihara inherently plasticizes the uppermost workpiece (8).

Nishihara also teaches [c] moving said rotating tool (2) axially toward the lowermost workpiece (5) through the material being plasticized only until it contacts the top surface of the lowermost workpiece (5) without penetrating the lower workpiece (5) so as to produce (Figure 1), due to friction of the pin-like projection (2c) on the surface of the lowermost workpiece (5), a metallically clean surface whereby a gastight joint is formed between the upper (8) and the lowermost workpiece (5). It is the examiner's position that Figure 1 of Nishihara positively teaches that the tip of the friction stir tool is brought into contact with the top surface of the lowermost workpiece. It should be noted that Nishihara does not teach or suggest that the tip of the friction stir tool penetrates into the lowermost workpiece. If the lowermost workpiece was penetrated during the friction stir process a portion of the lowermost workpiece would be pulled into recesses (5a) and the joint would not look like that of Figure 1. Thus, the process described by Nishihara inherently results in a metallically clean surface whereby a gas tight joint is formed between the upper and the lowermost workpiece.

If Figure 1 of Nishihara does not anticipate the limitation "moving said rotating tool axially toward the lowermost workpiece through the material being plasticized only until it contacts the top surface of the lowermost workpiece without penetrating the lower workpiece", then it is the examiner's position that at the time of the invention this limitation would have been obvious to one of ordinary skill in the art. One of ordinary skill in the art would have been motivated to bring the tip rotating tool into contact with the top surface of the lowermost workpiece without penetrating the lowermost workpiece in order to optimize the flow of plasticized material from the upper workpiece into the recess of the lower workpiece. In other words, it would have been obvious to one of ordinary skill in the art to set the plunge depth of the friction stir tool to the top surface of the lowermost workpiece in order to maximize the downward flow of the upper workpiece into the recess. The closer the tip of the rotating tool is brought to the interface between the upper and lower workpieces the more easily the plasticized material of the upper workpiece will flow into the recess of the lower workpiece. Accordingly, the friction stir process described by Nishihara would clearly have the highest efficiency when the tip of the friction stir tool just contacts the surface of the lowermost workpiece. This obvious technique insures that a proper joint is formed and no voids occur in the recess. Additionally, it is the examiner's position that this process intrinsically results in a metallically clean surface whereby a gas tight joint is formed between the upper and the lowermost workpiece. The rotating tool of Nishihara is ultimately removed from the workpieces.

With respect to claim 2, it is the examiner's position that since Nishihara and the applicant are performing the same process with the same materials alloying will occur at the interface between the two materials being joined in Nishihara.

With respect to claim 3, it is the examiner's position that the process of Nishihara will inherently remove oxides from the surfaces of the workpieces as the pin-like projection frictionally engages the surfaces of the workpieces.

With respect to claim 4, Nishihara teaches that the tool with the pin-like projection is moved along the joint area (Figures 1 and 12).

The limitation of claim 5 is inherent to friction stir processing.

With respect to claim 6, Nishihara teaches that the pressure is applied by a shoulder (2b) of the tool around the pin-like projection (2c) (Figure 1).

With respect to claim 7, Nishihara teaches that the workpieces are joined also in a form-locking manner (Figures 1 and 12).

With respect to claim 8, Nishihara teaches that the workpieces are joined in a form-locking manner by the introduction of plasticized material into cavities formed into the lower workpiece (Figures 1 and 12).

With respect to claim 10, it is the examiner's position that the limitation "wherein the length of said pin-like projection is selected so as to correspond essentially to the thickness of the uppermost workpiece or upper workpieces placed on top of the lowermost workpiece" is inherent to Figure 1 of Nishihara.

(10) Response to Argument

The applicant argues that:

> "It is not said exactly how far the tool (2) moves into, or through, the upper workpiece and it cannot be determined from this reference for example where the tip of the friction welding tool is stopped upon reaching the top surface of the lower workpiece."

The examiner disagrees as Figure 1 of Nishihara clearly establishes that the friction stir tool is brought down to the interface between the upper and lower workpiece. In any event, the claimed plunge depth is obvious to one of ordinary skill in the art for the reasons set forth in the new 102/103 rejection above.

The applicant states that:

> "with the method according to the invention no mixing of the materials of the upper and the lowermost workpieces takes place nor is it desired. Rather, a so-called diffusion weld is formed wherein individual atoms of one of the workpiece diffuse into the other workpiece so as to form a stable connection between the workpieces. To this end, it is neither necessary nor is it desirable that also the lower workpiece is plasticized. It is however important that metallically clean surfaces are provided in order to enhance the diffusion of the individual atoms from one workpiece into the other."

The applicant's argument with respect to the diffusion weld is not commensurate in scope with the claims, since the claims do not require a diffusion weld to be formed. It should further be noted that the applicant's disclosure lacks support for forming such a diffusion weld. Nishihara does not teach or suggest penetrating the lowermost workpiece with the friction stir tool to intermix the uppermost and lowermost workpieces.

Nor does Nishihara teach or suggest plasticizing the lowermost workpiece. The applicant has failed to provide a persuasive argument or evidence that the lowermost workpiece of Nishihara is plasticized. Independent claim 1 requires "generate friction heat to at least plasticize the material of said uppermost workpiece". (emphasis added). This limitation fails to limit the claim to a process in which only the uppermost workpiece is plasticized. Clearly the language of the claim allows for both the uppermost and lowermost workpieces to be plasticized during the friction stir process. In other words, the language of independent claim 1 fails to positively define a process in which the lowermost workpiece is not plasticized at all.

It is the examiner's position that Nishihara and the applicant are performing the same process with the same materials. Accordingly, it is the examiner's position that the process of Nishihara inherently results in the same type of diffusion weld that the applicant asserts their process achieves.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)** above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

/Kiley Stoner/ 1/31/08
Kiley Stoner

Primary Examiner A.U. 1793

A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:

GREGORY MILLS
QUALITY ASSURANCE SPECIALIST

Conferees:

GREGORY MILLS
QUALITY ASSURANCE SPECIALIST

WILLIAM KRYNSKI
SPECIAL PROGRAM EXAMINER
TECHNOLOGY CENTER 1700